



## Avulsion Fracture of the Tibial Tubercle Associated with Patellar Ligament Avulsion in a Sporting Adolescent. A Rare Case

### Adölosan Sporcuda Patellar Ligaman Yırtığının Eşlik Ettiği Tuberositas Tibia Avülsiyon Kırığı. Nadir Görülen Olgu Sunumu

Avulsion Fracture in a Sporting Adolescent

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#### Özet

Akut tibial tüberkül avülsiyon kırığı nadir görülen bir durumdur ve genellikle proksimal tibia fizisinin açık olduğu adölosanlarda sportif faaliyetler esnasında oluşur. Bu yazıda amatör güreşçi bir adölosanda patellar tendon kopmasının eşlik ettiği tibia tuberositas avulsion kırığı olgusu sunulmaktadır. Açık redüksiyon ve internal tespit ile patellar tendon ve avülse tuberositas tibia başarılı bir şekilde tedavi edildi. Hastanın son kontrolde etkilenen dizinin tam hareket açıklığına sahip olduğu, ameliyattan 6 ay sonra sportif faaliyetlerine döndüğü görüldü.

#### Anahtar Kelimeler

Avülsiyon Kırığı; Adölosan Sporcu; Tibial Fizis; Patellar Tendon

#### Abstract

Acute tibial tubercle (AFTT) avulsion fracture is a rare condition and generally occurs in the adolescents during sporting activities before the closure of the proximal tibial physis. We report a rare case of avulsion fracture of the tibial tuberosity associated with patellar tendon avulsion of an adolescent amateur wrestler. The patient was treated successfully by patellar tendon reattachment with open reduction and internal fixation. At the last time follow up he had a full range of motion and full recovery. He could turn back to the sportive activities after 6 months from the surgery.

#### Keywords

Avulsion Fracture; Sporting Adolescent; Tibial Physis; Patellar Ligament

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## Introduction

Acute tibial tubercle (AFTT) avulsion fracture is a rare condition and generally occurs in the adolescents during sporting activities before the closure of the proximal tibial physis [1]. The injury mechanism has been described mostly as an acute pull-of strength of the patellar tendon with tightly contraction of the quadriceps femoris muscle while the knee in flexion position or a violent contraction of the quadriceps muscle with the foot fixed [2-4]. According to the fracture pattern conservative or different fixation methods of the operative management were described for the treatment strategy [5,6]. In the literature while first described by Mayba [7] there are a few studies associated with simultaneous patellar tendon avulsion rupture with AFTT [4,8]. We report a rare case of avulsion fracture of the tibial tuberosity associated with patellar tendon avulsion of a sporting adolescent.

## Case Report

A 14 year old boy with a painful swollen knee was admitted to the orthopaedic outpatient department with the history of sport injury of wrestling before a week from the application. Physical examination showed right knee pain with a great anterior effusion with high riding patellae. At the distal end of the patella tendon a gap was also palpable with the suspicion of a small avulsed fragment of the tibial tubercle. There was no neurovascular deficit but in the right lower extremity the extensor mechanism was disrupted. The patient was not able to lift his right leg straightly in extension position. From the patient's history, the injury occurred with a mechanism of an acute pull-of strength of the patellar tendon with tightly contraction of the quadriceps femoris muscle while the knee in flexion position while he was wrestling. Then the patient had a sudden pain on the right knee and he was not able to continue playing with the complaint of difficulty on walking. One week after the trauma when swelling of the knee and pain were increased he was referred to our orthopaedic outpatient department. The patient's health was good and his past medical history included no other comorbidities or drug use like steroid.

On the radiologic examination of the right knee by XR imagination there was a high position of the patellae with soft tissue distension. Also there was a bony avulsion of the right tibial tubercle possibly attached to the proximal patellar tendon (Figure 1).

Surgical repair of AFTT was considered and with an almost 6 cm midline longitudinal anterior incision open reduction and internal fixation was performed. Intra-operatively after removing the haemarthrosis it was found that patellar tendon was partially avulsed from its insertion and there were complete avulsions of the tibial tuberosity. The tibial tubercle was reduced and fixed using a staple. Partially avulsed patellar tendon was repaired primarily using 2/0 Ethibond suture anchors with Krackow suture technique. After surgery the patient was immobilized in a full extension cast for 4 weeks then the cast was removed and intensive rehabilitation programme (quadriceps strengthening, exercises active range of motion) was started. 6 weeks after the surgery the patient had full range of motion of the injured knee without any pain, flexion or extension lag (Figure 2). He was able to return to his sporting activities after



Figure 1. Bony avulsion of the right tibial tubercle possibly attached to the proximal patellar tendon with soft tissue distension.



Figure 2. 6 weeks after the surgery the patient had full range of motion of the injured knee without any pain, flexion or extension lag.

4 months and at the last time follow up 8 months after the operation there was no functional impairment and radiographs showed full bony union (Figure 3). Also there was no quadriceps atrophy or reduced muscle strength compared to the left knee.

## Discussion

Simultaneous lesions of patellar tendon avulsions with AFTT and their treatment have been reported in the literature [4,6-8]. In our case there was a partial patellar tendon avulsion with type 3 AFTT fracture according to the Ogden classification. Corresponding to the time of the secondary ossification closure Ogden reported that AFTT occurs in a age group of 13-17 age affecting boys more than girls. Maybe [7] also first had described this type of injury in a 15 year old boy. Furthermore in some

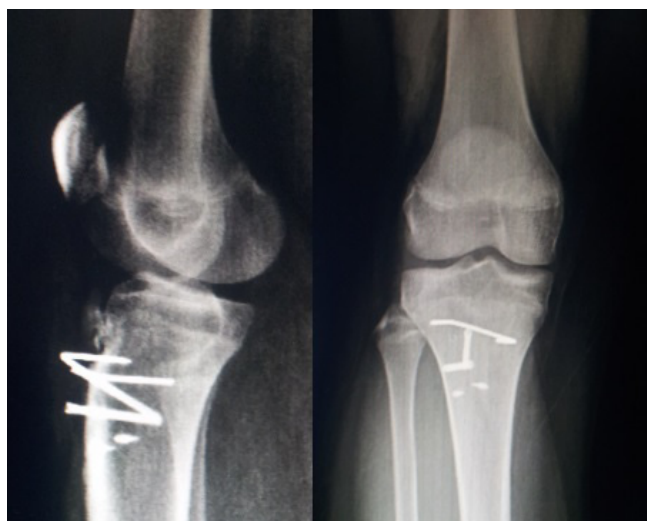


Figure 3. 8 months after the operation radiographs showed full bony union.

other studies AFTT reported in sporting adolescent [1,3,8]. Our patient was 14 year old boy in accordance with the literature and also he was an amateur wrestler that we think this is the first report of a wrestler with an injury of AFTT in the literature. The injury was occurred with a mechanism of an acute pull-of strenght of the patellar tendon with tightly contraction of the quadriceps femoris muscle while the knee in flexion position. We thought that the violent contraction of the quadriceps muscle both had avulsed the tibial tubercle totally and the patellar ligament partially. Different methods for the treatment of the AFTT were described in the literature where for the open reduction and fixation transfixing pins, screws, staples, tension bands were used according to the age of the patient, the comminution of the fragment, and the surgeon's experience [1,2]. For simultaneous patellar tendon avulsion with AFTT open reduction and fixation was supported as the best prosedure in some studies [7,8] in the literature, we also performed this prosedure using a staple. With open surgical treatment we were able to see the discontinuity of the extensor apparatus of the knee inspecting all articular structures. The patellar tendon avulsion was repaired using Krackow technique. We support the idea that open reduction and internal fixation is the best prosedure for the treatment of the AFTT especially where there is an associated avulsion of the patellar ligament. We had an excellent result as previously reported studies [4,8].

### Conclusion

In this report, presenting AFTT with avulsion of patellar ligament for the first time in an amateur wrestler, we want to emphasize the importance of the open reduction and internal fixation prosedure with excellent outcome.

### Competing interests

The authors declare that they have no competing interests.

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